# *Hume's Problem of Induction*

*March 2, 2015*

## *Inductive Reasoning*

Most of what we believe about the world we believe on the basis of *inductive reasoning.*

Example of Inductive Reasoning

**P1** All as of yet observed *A*s have been *B*s.

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**C** The next observed *A* will be *B*.

Are we *justified* in believing the conclusion of arguments of this form?

Notice: the conclusion doesn't *deductively follow* from the premise — it is possible for the premise to be true and the conclusion false.

**Note:** We certainly don't think that *all* instances of this reasoning are okay. It depends on what we plug in for '*A*' and '*B*'. For example, we wouldn't (and shouldn't) reason from the fact that all as of yet observed hairs on my head are non-white to the conclusion that the next observed hair on my head will be non-white. Or, for example, that all as of yet observed planets have been observed that *all* planets are observed.

1. **The Uniformity of Nature.** If nature is uniform — that is, if the regularities that have held in the past will continue to hold in the future — then we can turn our inductive inference into a deductively valid inference.

Uniformity of Nature

**P1** All as of yet observed *A*s have been *B*s.

**P2** **Uniformity of Nature:** If a regularity has held in the past, it will continue to hold in the future.

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**C** The next observed *A* will be *B*.

*Problem:* Are we justified in believing that nature is uniform?

2. **Induction Has Always Worked So Far!** Maybe our inductive inferences are justified because they work. So far, every time we've used induction, we've been right.

   **Claim:** All as of yet observed instances of inductive reasoning have been successful, therefore, the next observed instance of inductive reasoning will be successful.

*Problem:* That's circular. In order for the past success of inductive reasoning to justify our use of it on this occasion, we have to assume that inductive reasoning works.

3. **Causation.** Maybe we're justified in using inductive reasoning by making a causal inference.

CAUSAL INDUCTIVE ARGUMENT

| | |
|---|---|
| **P1** | All as of yet observed *A*s have been *B*s. |
| **P2** | **Causal Claim:** There is a causal connection between something being an *A* and it being a *B*. |
| **C** | The next observed *A* will be *B*. |

*Problem:* This works only if our beliefs about causation are justified. Hume, however, is skeptical that we're justified in believing that one thing caused another.

4. **Bayesian Induction.** Does Bayesianism solve the problem of induction? Let $H$= *All As are B*. And let $E_i$= *The ith observed A is a B*.

$$\Pr(H \mid E_1 \wedge \cdots \wedge E_n) = \frac{\Pr(E_1 \wedge \cdots \wedge E_n \mid H) \cdot \Pr(H)}{\Pr(E_1 \wedge \cdots \wedge E_n)}$$

And $\Pr(H \mid E_1 \wedge \cdots \wedge E_n) > \Pr(H)$.

Does this show that we're justified in making inductive inferences?

## *Some Extra Principles*

1. *The Principal Principle.* "Match your degrees of belief to the objective chances!"

$$\Pr(X \mid ch(X) = x) = x$$

2. *The Relative Frequency Principle.* "Match your degrees of belief to the relative frequencies!"

$$\Pr(X \mid relFreq(X) = x) = x$$

3. *The Reflection Principle.* "If you know what your better informed future-self will believe, then you should believe it now!"

$$\Pr\left(X \mid \overset{+}{\Pr}(X) = x\right) = x$$

4. *The Deference to Experts Principle.* "Defer to the experts!"

$$\Pr(X \mid Expert(X) = x) = x$$